

## Quadratische Funktionen: Scheitelpunktform in Faktorierte Form umformen

### Aufgabe:

Forme die Scheitelpunktform in Faktorierte Form um.

a)  $f(x) = (x + 5)^2 - 16$

b)  $f(x) = (x + 3)^2 - 1$

c)  $f(x) = (x + 4)^2 - 9$

d)  $f(x) = (x - 2)^2 - 1$

e)  $f(x) = (x + 4)^2 - 9$

f)  $f(x) = (x + 2)^2 - 16$

g)  $f(x) = (x + 3)^2 - 9$

h)  $f(x) = (x - 3)^2 - 4$

i)  $f(x) = (x - 4)^2 - 25$

### Lösung:

a)  $(x + 5)^2 - 16 = 0 \quad | + 16$   
 $(x + 5)^2 = 16 \quad | \sqrt{\quad}$   
 $x + 5 = 4 \quad | -5 \quad \text{und} \quad x + 5 = -4 \quad | -5$   
 $x = -1 \quad \text{und} \quad x = -9$   
 $f(x) = (x + 1) \cdot (x + 9)$

b)  $(x + 3)^2 - 1 = 0 \quad | + 1$   
 $(x + 3)^2 = 1 \quad | \sqrt{\quad}$   
 $x + 3 = 1 \quad | -3 \quad \text{und} \quad x + 3 = -1 \quad | -3$   
 $x = -2 \quad \text{und} \quad x = -4$   
 $f(x) = (x + 2) \cdot (x + 4)$

c)  $(x + 4)^2 - 9 = 0 \quad | + 9$   
 $(x + 4)^2 = 9 \quad | \sqrt{\quad}$   
 $x + 4 = 3 \quad | -4 \quad \text{und} \quad x + 4 = -3 \quad | -4$   
 $x = -1 \quad \text{und} \quad x = -7$   
 $f(x) = (x + 1) \cdot (x + 7)$

d)  $(x - 2)^2 - 1 = 0 \quad | + 1$   
 $(x - 2)^2 = 1 \quad | \sqrt{\quad}$   
 $x - 2 = 1 \quad | +2 \quad \text{und} \quad x - 2 = -1 \quad | +2$   
 $x = 3 \quad \text{und} \quad x = 1$   
 $f(x) = (x - 3) \cdot (x - 1)$

e)  $(x + 4)^2 - 9 = 0 \quad | + 9$   
 $(x + 4)^2 = 9 \quad | \sqrt{\quad}$   
 $x + 4 = 3 \quad | -4 \quad \text{und} \quad x + 4 = -3 \quad | -4$   
 $x = -1 \quad \text{und} \quad x = -7$   
 $f(x) = (x + 1) \cdot (x + 7)$

f)  $(x + 2)^2 - 16 = 0 \quad | + 16$   
 $(x + 2)^2 = 16 \quad | \sqrt{\quad}$   
 $x + 2 = 4 \quad | -2 \quad \text{und} \quad x + 2 = -4 \quad | -2$   
 $x = 2 \quad \text{und} \quad x = -6$   
 $f(x) = (x - 2) \cdot (x + 6)$

g)  $(x + 3)^2 - 9 = 0 \quad | + 9$   
 $(x + 3)^2 = 9 \quad | \sqrt{\quad}$   
 $x + 3 = 3 \quad | -3 \quad \text{und} \quad x + 3 = -3 \quad | -3$   
 $x = 0 \quad \text{und} \quad x = -6$   
 $f(x) = x \cdot (x + 6)$

h)  $(x - 3)^2 - 4 = 0 \quad | + 4$   
 $(x - 3)^2 = 4 \quad | \sqrt{\quad}$   
 $x - 3 = 2 \quad | +3 \quad \text{und} \quad x - 3 = -2 \quad | +3$   
 $x = 5 \quad \text{und} \quad x = 1$   
 $f(x) = (x - 5) \cdot (x - 1)$

i)  $(x - 4)^2 - 25 = 0 \quad | + 25$   
 $(x - 4)^2 = 25 \quad | \sqrt{\quad}$   
 $x - 4 = 5 \quad | +4 \quad \text{und} \quad x - 4 = -5 \quad | +4$   
 $x = 9 \quad \text{und} \quad x = -1$   
 $f(x) = (x - 9) \cdot (x + 1)$